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EDITORIAL.

AT THE recent meeting of the British Association for the Advancement of Science in Nottingham, the section devoted to geology was perhaps the busiest department of the association. Contributions covering nearly all phases of the science crowded the time allotted to the reading of papers. Among them petrology held a prominent position, owing to the eminent character of the president of the section, and to his successful labors in this branch of geology. Mr. Teall based his presidential address upon the data furnished by petrological research, which, to his thinking, lend additional strength to the uniformitarian doctrines of Hutton. By a variety of illustrations he showed the identity of ancient and modern rocks, whether sedimentary, igneous, or metamorphic, and inferred a similarity of physical conditions attending their formation. He emphasized the high degree of differentiation of organic life at the time when the first Cambrian strata were deposited, and maintained that the crystalline schists of earlier age, so far as we have yet become acquainted with them, do not contain the records of the early stages of the planets' history. They can not be considered to represent the primitive crust of the earth. His testimony as to the identity of the volcanic lavas erupted in Paleozoic and Tertiary times in Great Britain, both as regards their structure and composition, allowance being made for subsequent alteration, is significant. It shows that in this region, through a long succession of ages, the groups of rock magmas developed in different periods of volcanic activity have been similar, and that the essential character of the petrographical province did not change.

Sir Archibald Geikie's paper, "On Structures in Eruptive Bosses which Resemble those of Ancient Gneisses," was a valuable

contribution to the study of gneissic structure, since it showed the possibility of a part, at least, of the banding in these rocks being due to a primary banding of igneous masses through some process of segregation or through differentiation of the magma into layers. A parallel banding of igneous rocks in the neighborhood of a plane of contact has been known, but its magnitude is generally inconsiderable. The structure in the gabbro on the Isle of Skye, however, which was described by Geikie, is on a large scale, and without apparent relation to a plane of contact. No attempt was made to suggest a cause for such a mode of segregation, since the study of the locality where it is best developed is not yet completed.

Prof. Brögger's paper, "On the Genetic Relations of the Basic Eruptive Rocks of Gran, Christiania Region," presented an array of facts with regard to the differentiation of rock magmas. By means of chemical analyses and field observations he showed that basic magmas of like composition in neighboring localities had separated into pairs of magmas, which were quite unlike one another chemically; producing dissimilar pairs of rocks. This proves that a given magma may differentiate in more than one manner, according to circumstances. The entire paper is to appear in the Quarterly Journal of the Geological Society.

Mr. Harker discussed the question of magmatic concentration, or differentiation, with reference to its probable cause, and pointed out what seemed to him obstacles to the application of Soret's principle. He suggested that a more probable explanation would be found in Berthelot's principle, or that of maximum dissipativity. The applicability of Soret's principle to the differentiation of magmas is also assailed by Prof. Bäckström in an article to appear in the next number of this JOURNAL, and the principle of liquation advocated. While it is quite probable that all of the phenomena of segregation and differentiation may not be accounted for by one law of diffusion dependent on osmotic pressure, and while this law finds its most perfect realization in the most dilute solutions, and while certain separations of rock magma may take place near the point of saturation, still it can

not be denied that rock magmas at times are known to attain extreme liquidity. Moreover, there must undoubtedly be a number of different physical causes at work conjointly, each of which may preponderate under favorable conditions, so that it is quite probable that no single process will be found adequate to explain all the phenomena in question.

It is interesting to observe that, while the majority of petrologists are engaged in studying the evidences of differentiation of molten rock magmas, the theory of magmatic synthesis proposed by Bunsen is not being wholly neglected. From the nature of a portion of the evidence it is possible to frame diametrically opposite hypotheses, but when all of the conditions are taken into account it would seem that but one of the hypotheses can have a general or far-reaching application. Prof. Sollas's paper, "On the Origin of Intermediate Varieties of Igneous Rocks by Intrusion and Admixture, as Observed at Barnavave, Carlingford," demonstrated how intimately the material of an acid molten magma may penetrate the interstices of a highly fractured rock, in this case basic; the delicate veins thinning to almost microscopic dimensions. Instances of this kind are well known. The assumption, however, that this process has taken place to a very considerable extent, and has produced bodies of rock of intermediate composition, seems to ignore the probable physical conditions under which rock magmas are erupted, and also the geological probabilities of such things happening. Thus there may be no defect in the logic of the assumption as an abstract idea, but there may be little or no probability of its ever taking place to a considerable extent in nature.

Other petrological papers were presented by Prof. Sollas, Mr. Watts, Dr. Johnston-Lavis, and an interesting account of the volcanic phenomena of Japan was given by Prof. Milne, and illustrated by lantern slides. It cannot be out of place, for one who has been fortunate enough to have been a guest of the Association, to express a high appreciation of the honor, as well as of the generous social hospitality which has become a distinguishing characteristic of these meetings.

J. P. I.